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Journal of the Society of Arts.

FRIDAY, MAY 11, 1866.

Announcements by the Council.

ORDINARY MEETINGS.

Wednesday Evenings, at Eight o'Clock:—

MAY 16.—*Derby Day*—No Meeting.

MAY 23.—“On Granite Working.” By GEORGE W. MUIR, Esq.

CENTRAL HALL OF ARTS AND SCIENCES.

The arrangements for erecting a Great Central Hall of Arts and Sciences at Kensington, on the ground purchased out of the profits of the Exhibition of 1851, having been carried so far as to secure the erection of that building, it has been thought desirable that members of the Society of Arts should be put in possession of full information on the subject, in case they should desire to invest in the property, before the whole of the available seats are disposed of. A copy of the prospectus was, therefore, forwarded to each member with a former number of the *Journal*, and the Secretary of the Society will afford any further information on the subject if applied to. A model of the Hall is now on view at the Society's house.

Proceedings of the Society.

MEMORIALS OF EMINENT MEN.

A Committee has been appointed by the Council to consider and report how the Society may promote the erection of statues or other memorials of persons eminent in arts, manufactures, and commerce. The following gentlemen have been requested to serve on this Committee:—

Mr. William Hawes, Chairman of the Council, Earl Stanhope, The Right Hon. W. Cowper, M.P., Lord Henry Lennox, M.P., Mr. H. B. Bodkin (Assistant-Judge), Messrs. Harry Chester, H. Cole, C.B., S. Redgrave, C. Wren Hoskyns, G. Hamilton, M.P., John Bruce, Captain Donnelly, R.E., A. J. B. Beresford Hope, M.P., J. J. Bond, R. Fisher, Lieut.-Col. Scott, R.E., H. Vaughan, G. E. Street, P. C. Hardwick, Sir John Thwaites, J. W. Bazalgette, George Vulliamy, and G. C. T. Bartley.

The Committee met on Monday, the 7th inst., and took into consideration the following suggestions:—

MEMORANDA ON THE PROPOSAL TO PLACE LABELS ON HOUSES IN THE METROPOLIS KNOWN TO HAVE BEEN INHABITED BY CELEBRATED PERSONS. SUBMITTED TO THE COMMITTEE OF THE SOCIETY OF ARTS.

In looking over some papers relative to the subject of labelling houses in the metropolis which have been inhabited by celebrated persons, I find the following re-

mark, by Samuel Rogers, in a note to one of his poems, and it appears apt and appropriate to the subject:—

“There is a custom on the Continent, well worthy of notice. In Boulogne we read, as we ramble through it, ‘Ici est mort l’auteur de Gil Blas;’ in Rouen, ‘Ici est né Pierre Corneille;’ in Geneva, ‘Ici est né Jean Jacques Rousseau;’ and in Dijon there is the ‘Maison Bossuet;’ in Paris the ‘Quai Voltaire.’ Very rare are such memorials among us, and yet wherever we met *with them*, in whatever country they were, or of whatever age, we should surely say that they were evidences of refinement and sensibility in the people.” At Cogoletto also, I remember a similar label over a house where some say that Christopher Columbus was born. It is devoid of any pretensions to artistic beauty, yet is a point of great attraction to the village, and all visitors along the Corniche road stop and read its Latin inscription; probably few would notice the house or the fact connected with it if to do so required hunting in a ‘Murray's Guide.’ Similar labels abound in Germany, especially at Hanover, also at Munich, and elsewhere.

It is indeed remarkable that this custom has not long ere this been prevalent in London, where so many historic houses still remain, but there can be little doubt that if once started the public would be interested in the matter, and that it would receive very general support and assistance.

The chief difficulty would be in the expense of erecting the first few labels, in order to start the scheme, and if this were done by an influential society, such as the Society of Arts, it would, I venture to think, rapidly be followed by many persons, living in or owning houses historically interesting, who would undertake to note the fact at their own expense by some ornamental label.

To further this object, I have prepared the accompanying index of names of noteworthy persons known to have resided in the houses mentioned; in some cases having been born in them, in others having died in them, and in others having merely lived in them for a portion of their existence. As far as possible houses which have been destroyed of late years have been excluded, though it is probable or rather certain that even in the last twelvemonths several interesting relics have been removed by the numerous metropolitan improvements. The list is about half finished, but I would willingly have it made as complete as possible, though I think enough is done to give some idea of the amount of interesting matter which remains, and which these labels would make known. To travellers up and down in omnibuses, &c., they might sometimes prove an agreeable and instructive mode of beguiling a somewhat dull and not very rapid progress through the streets.

After thinking over the details of the scheme, I would venture to make the following remarks:—

In selecting the first few houses to be labelled, it would appear advisable to take, as far as possible, those which are situated in the principal thoroughfares.

The nature of the labels themselves is of course a matter of taste, and no doubt would be settled by those who put them up, having regard not only to the appearance, but also to the cost. At the same time it appears to me that they should differ as far as is possible from monumental or funeral tablets, as the public would certainly not like or tolerate the chief thoroughfares being converted into streets of tombs of a cheap and modern style. The same remark would apply to any attempt which might be made in this advertising age to utilize the memory of a former inhabitant for commercial advantages; this should be as much as possible avoided.

Concerning the make of the labels it would seem that imperishability and ease in cleaning from deposits of soot, &c., form essential elements, as also, to a certain extent, moderate cheapness; I cannot think of anything that better meets these requirements, being at the same time of a most ornamental character, than the reviving and most ancient mode of wall decoration, viz., mosaic. In

many ways this might be used; either a plain polished marble or red granite slab, with an ornamental border of mosaic, or perhaps mosaic letters and a gold background with geometric border of the same material, but these details circumstances would settle, as the taste of the erector might prefer.

The wording of the inscription on the label is a matter of importance, and it appears to me that all terms of praise, or otherwise, should be omitted, and merely the plain statement of the facts given, consisting of names—for what celebrated—and dates of birth and death. The whole to be as concise and distinct as possible, to enable all who run to read.

The height of the labels on the walls must necessarily be settled by circumstances, but should generally be, I think, about 12 or 14 feet from the ground, according to the height of the ground floor.

A good effect, springing from such a custom as this, may be a tendency to increase the public estimation for places which have been the abodes of men who have made England what it is; and thus some of the old haunts of London, teeming with historic interest, may be preserved from the ruthless hands of modern destroyers and improvers.

Should these remarks, and the papers I enclose, be of any use in carrying out the scheme, I should be glad to complete them, and, if desired, to carry out the erection of any tablets which it may be determined to put in hand.

GEORGE C. T. BARTLEY.

13th April, 1866.

141, New Bond-street:—

VISCOUNT NELSON
Lived here in 1797.

B. 1758.

D. 1805.

7, Craven-street, Strand:—

BENJAMIN FRANKLIN
Lived here.

Printer, Philosopher, and Statesman.

B. 1706.

D. 1790.

Artillery-walk, Bunhill-fields:—

JOHN MILTON
Finished "Paradise Lost" here.
Author of
"Paradise Lost,"
"Paradise Regained,"
"L'Allegro e il Penseroso,"
&c., &c.

B. 1608.

D. 1674.

24, Holles-street, Cavendish-square:—

LORD BYRON
Born here in
1788.

Author of
"Childe Harold,"
"Eastern Tales," &c., &c.

B. 1788.

D. in Greece 1824.

Rawthmell's Coffee-house, Henrietta-street, Strand:—

THE SOCIETY OF ARTS, MANUFACTURES,
AND
COMMERCE,

Was established and held its first meeting
Here on the 22nd March, 1754,
Viscount Folkestone, President.

8, Bolt-court, Fleet-street:—

DR. S. JOHNSON
Lived and died here.
Author of
The English Dictionary,
&c., &c., &c.

B. 1709.

D. 1784.

57, Brook-street, Grosvenor-square:—

HANDEL
Lived here.
Composer of
Music.

B. 1684.

D. 1759.

5, The Terrace, Adelphi:—

DAVID GARRICK
Lived and died here.
Actor.

B. 1716.

D. 1779.

14, Hertford-street, May-fair:—

DR. JENNER
Lived here.

The discoverer of Vaccination.

B. 1749.

D. 1823.

28, Lower Grosvenor-street:—

SIR HUMPHREY DAVY, P.R.S.,
Lived here.

Chemist, and Natural Philosopher.

Inventor of the Miner's Safety Lamp.

B. 1779.

D. 1829.

Inner Temple-lane, Fleet-street, in what are called
Farrar's-buildings:—

JAMES BOSWELL
Lived here.
Author of the "Life of
Dr. Johnson."

B. 1740.

D. 1795.

Charles-street, St. James's-square:—

EDMUND BURKE
Lived here.

Author, Statesman, and Orator.

B. 1730.

D. 1797.

45, Berkeley-square:—

LORD CLIVE
Died here.
Warrior and Statesman,
Governor-General of India.

B. 1725.

D. 1774.

37, Bury-street, St. James's:—

GEORGE CRABBE
Lived here.
Poet.

Author of "The Library,"
"The Village," "The Borough," &c.

B. 1754.

D. 1832.

Brooke-street, Holborn:—

CHATTERTON
Lived and died here.
Poet.

B. 1752.

D. 1770.

Bedford-row, Bloomsbury:—

MRS. ELIZABETH CROMWELL
Lived here in 1731.
Daughter of the Protector.

The Committee resolved that the Chairman of Council should be asked to take the chairmanship of the Committee, and that Mr. G. C. T. Bartley should act as convener.

The Committee recommended that experiments with various descriptions of tablets be made, and that designs be produced for that purpose.

That on such tablets should be inscribed concise information relative to the individual or the fact commemo-

rated by such tablet, and that the name of the Society of Arts should be appended thereto.

The Committee further recommended that the tablets should not be limited to persons eminent in arts, manufactures, and commerce, but should include places and persons connected with historical events, such for instance as site of the residence of Lady Abingdon, where Abingdon-street now stands, who was known as the writer of the letter to Lord Monteagle in reference to the Gunpowder Plot, also the spot where Caxton worked his first press in Westminster, and the like.

Mr. Bartley laid before the Committee notes of suggestions in reference to names of persons and places suitable for record, and the Committee requested Mr. Bartley to continue them with a view to their being published in the Society's *Journal*.

TWENTY-SECOND ORDINARY MEETING.

Wednesday, May 9th, 1866; Major-General Vincent Eyre in the chair.

The following candidates were balloted for, and duly elected members of the Society:—

Carrick, Robert, Chemical Works, Methill, Leven, N.B. Taylor, Charles W., 167, Great Dover-street, S.E. Whight, George, Gipping Works, Ipswich.

The Paper read was—

ON THE PROGRESS OF FIRE-ARMS FOR MILITARY PURPOSES TO THEIR PRESENT STATE.

By COLONEL E. C. WILFORD,

Late Assistant-Commandant and Chief Inspector at the Hythe School of Musketry.

Infantry, having both offensive and defensive powers, are of higher relative value than either artillery or cavalry; they are numerically stronger, and can perform more varied duties. The requirements of a military small-arm are, accuracy at long ranges, celerity of fire at short, strength combined with lightness, sufficient length when the bayonet is fixed to be used as a pike, penetrating power for the projectile, minimum of recoil, and capability of being easily cleaned. It should be on the principle of "interchange." The barrel may be considered as a machine in which the propelling force is generated; the gas evolved from gunpowder may be regarded as the motive power, and the projectile and bayonet as the destroying agents.

Small-arms were not generally known in this country until the middle of the fifteenth century, and the first were called "hand-gonnes." The hand-gun was of very rude construction; it consisted of an iron or brass tube, with a touch-hole on the top; it had a straight wooden stock, about 2 ft. 6 in. long, and when fired the end of the stock was placed under the right armpit; the match was of slack-spun cotton or hemp boiled in a strong solution of saltpetre or lees of wine, and was ignited with the right hand. When used on horseback it was supported by a forked rest, attached to the pommel of the saddle. Some were breech-loaders, and these were of large calibre, and fired iron balls. The earliest improvements were suggested by the cross-bow. The cock was fixed to hold the match, and was brought down to priming by a trigger, hence it was called a "matchlock," and this name was afterwards applied to the whole weapon. From its simplicity of construction, this mode of ignition is still retained by many semi-civilized nations. A pan to hold the priming was placed on one side, with a sliding cover. The next step towards improvement was to shorten and widen the butt, so that it could be placed against the right breast; subsequently the stock was bent and flattened, and the butt pressed into the hollow of the right shoulder, and thus better aim could be taken; then the barrel was

lengthened, the calibre reduced, and the weapon was fired off a rest; the weight of this arm was from 12 lbs. to 18 lbs., and it was called a *harquebuss*.

The next stage of progress was the invention of the "wheel-lock" at Nuremberg, in 1517. It consisted of a steel wheel, rasped, protruding into the priming, and a cock, into which was fixed a piece of pyrites; the wheel was fitted on an axle, to which a spring was connected by a chain swivel. The cock was moved by hand to the wheel on which the pyrites rested; the lock was wound up by a key, and on pressing the trigger, the wheel rotated, sparks were emitted, and the priming ignited, hence came the name of "fire-lock." Its failure was owing to the intricacy of its construction, the softness of the pyrites, and the great expense of using it, and it was employed by cavalry only, the matchlock retaining its position with infantry.

Fire-arms had gained such ground by the reign of Edward VI., that archery began to decline rapidly, although not without much clamour, the bow being thought superior as a weapon, except in this respect, that the *harquebuss* had power to penetrate armour. Queen Elizabeth ordered bows to be replaced by "muskettes" in 1596; they nevertheless lingered in partial use until 1664, when they were employed for the last time by the Marquis of Montrose against the Scots.

The musket, supposed to have been introduced from Spain, was heavier than the *harquebuss* and of larger bore, with bullets ten to the lb. Another weapon, called the caliver, was of uniform bore and smaller than the musket, it was also lighter and fired without a rest. In 1621 the barrel of the musket was four feet long, and the bullets were twelve to the lb.

In 1629 hair-triggers were applied to the wheel lock, and called "tricket" locks; they are too delicate and dangerous for military purposes, and therefore never became general. The snap-haunce, a much improved lock, was invented in Germany towards the end of Queen Elizabeth's reign. A piece of furrowed steel which moved on a pivot was substituted for the wheel, the cock had flint instead of pyrites, and the pan was provided with a moveable cover; the steel or hammer was bent down over the pan, and on the trigger being pressed the cock struck the hammer, sparks were elicited, and the priming ignited. The position of the cock was on the far side of the pan, and fell towards the firer.

The modern flint-lock, a great advance upon the snap-haunce, was invented in France about 1635. It differed from the latter by dispensing with the pan cover, a hammer seat being substituted, and the cock placed between the firer and the pan, and so as to fall from the firer. So imperfect were all previous locks that two modes of ignition were frequently available.

In 1646 so inaccurate was the musket that the Earl of Albemarle suggested that six fowling-pieces be given to each company, with orders to fire at officers only. In 1677 Lord Orrery writes, "I wish our companies consisted of fewer shots and more pikes." In 1766 a General Loyd recommends "the abandonment of the system of arming the whole of the infantry with fire-arms, as not more than one shot in four hundred takes effect." Musket rests fell into disuse during the time of Cromwell—1649 to 1660. Iron ramrods were introduced about 1741. From the introduction of the flint-lock in 1635, there were no improvements for 200 years.

In 1800 the weight of the musket was 11 lbs. 4oz.; ditto of bayonet, 1 lb. 2oz.; length of barrel, 3 ft. 3in.: the bullets were 14½ to the lb. For priming, originally a finer grain powder was put into the pan from a flask, afterwards the touch-hole was made large enough to be a self-primer, latterly the top of the cartridge was bitten off and the pan filled before loading. The objections to the flint-lock were that the powder got wet, and consequently there were frequent misfires.

In 1807, the Rev. Mr. Forsyth invented a *fulminating powder*, which consisted of chlorate of potash, sulphur, and charcoal; it was, however, found too corrosive, and

was subsequently improved—it eventuated in the introduction of the percussion-cap, in 1842. Shooting then became more accurate and rapid, and the missfires were reduced to one in twenty-six. At the same date the charge was reduced from 6 drachms to $4\frac{1}{2}$ drachms, thus lessening recoil, while a block sight was fixed for shooting at distances of 150 yards. Notwithstanding all these improvements, however, at the end of 400 years the English soldier carried the worst musket in Europe. It had, 1st, the least accuracy; 2nd, the shortest range; 3rd, the greatest recoil; 4th, it was the heaviest weapon; 5th, it was the shortest weapon; 6th, it had the largest bore; 7th, it required a double charge of powder; and, 8th, it was the most expensive to use.

With regard to the bayonet, from the earliest ages some of the infantry were armed with pikes, and pikemen covered the archer, and afterwards fulfilled the same duty towards the musketeer as a protection against cavalry. Both carried a short sword; the musket rest, either with a spike on one prong or with one which flew out on touching a spring, was also used; eventually a short dagger was (1st) stuck into the muzzle, and (2nd) attached to the side; this ultimately led to the present bayonet, which is so arranged that when it is fixed the gun can still be fired. It was introduced subsequently to 1689, and is a French invention. Pikes were abolished in France in 1703.

Gunpowder still continues our motive power, and is made of the same ingredients as on its first discovery—saltpetre, charcoal, and sulphur—with vast improvements in the manner of purifying them, and in their mechanical combination and proportions. All this has, doubtless, tended to improve the construction of guns, and increase their effect. Air and steam have been tried without practical results, and gun-cotton is now in progress of experiment. Great propulsive, and mild explosive force, uniformity of effect, entire combustion, non-liability to the influences of climate, facility of transport, and keeping powers—are the leading desiderata for the propelling material for fire-arms.

Short arrows, balls of stone, iron, and lead, have been fired out of muskets, but for many years spherical balls of lead only were used.

In reference to the imperfections of the musket, I will quote from a lecture on the rifle, delivered by me at the United Service Institution:—

“The shooting powers of the English musket, pattern 1842, were tested in a series of experiments undertaken at Chatham in 1846, under Lieut.-Colonel M’Kerlie, Royal Engineers, by order of the Government, whose clear and able report concludes as follows:—‘It appears that musketry fire should never be opened beyond 150 yards, and certainly not exceeding 200 yards. At this distance (200 yards) half the shots missed a target eleven feet six inches, and at 150 yards a very large proportion also missed. At 75 and 100 every shot struck the target only two feet wide, and had the deviation increased simply as the distance, every shot ought to have struck the target six feet wide at 200 yards; instead of this, however, some were observed to pass several yards to the right and left, some to fall 30 yards short, and others to pass as much beyond, and this deviation increased in a still greater degree, as the range increased. It is only then under peculiar circumstances, such as when it may be desirable to bring fire upon field artillery, when there are no other means of replying to it, that it ought ever to be thought of using the musket at such distances as 400 yards.’ It is an undoubted truth, that the comparative worthlessness of infantry fire was deplored by intelligent officers of all armies. The following extract from ‘Decker’s Three Arms,’ translated by Major Inigo Jones, Prince Albert’s Hussars’ (page 14) will show how lowly it was estimated:—‘The fire of the line decides nothing, and is generally kept up to employ the men in the front line, till other troops are brought into play.’ How significant! Had the word ‘also’ been introduced, it would have read thus, ‘till other troops are also brought into

play.’ Mr. Decker adds, ‘To make the fire of the line effective, it ought not to commence further than 200 yards at the outside, when only one shot in ten will hit on an average. It is even now and then employed to keep young or bad soldiers employed, and to blunt the idea of danger. The reason is pitiful; however, a soldier remains with his feelings as a man, but forgets his human weakness in the heat of battle. Suwarrow, also, knowing the inefficiency of line fire, used to tell his soldiers that three cartridges were enough for each; with one he was to shoot an enemy 30 yards off; the second man he was to bayonet; and all the rest would run away.’

“Hence it seems to be admitted that beyond 80 yards it lost all certainty of hitting a single man; at 200 yards it was uncertain even at large bodies; at 300 yards you might shoot all day at a target eighteen feet square, and never strike it once; so that a man would be in perfect security although fired at from sunrise to sunset, at even a shorter distance than 300 yards provided the firer made a faithful promise always to aim at him; but should he take the liberty of aiming 50 yards right or left, above or below, I should then be sorry to answer for the possible consequences. * * * * *

“Admiral Sir Thomas Maitland informed me of an experiment on a large scale, by order, and in presence of, the late Emperor Nicholas of Russia. There were 10,000 infantry drawn up in regiments, three ranks deep, and a target, six feet in height, and the width of a regiment, was placed opposite to each. They commenced firing at 300 yards, but the targets were not hit; at 200 yards some little business was done; but not until they marched up to 100 yards, was the execution worth speaking of.”

The rifle was very partially introduced into our army in 1794, and has now come into general use. I need not inform you that the object of rifling is to give rotation to the projectile round its axis of progression, in order to insure a regular and steady flight. On this subject I quote from the text book used by officers in the ‘Schools of Musketry:—

“Various plans have been proposed for furnishing the projectile itself with vanes, wings, grooves, or other configurations intended to give it rotation during its passage through the air; but the only practical method hitherto adopted has been to make the barrel of a fire-arm of such a shape in its interior, that the projectile while being propelled from the breech to the muzzle may receive a rotatory combined with a forward motion.

“The systems of rifling in general use may be classified under three headings.

“First—*The Grooved Cylinder*.—Rifling by grooves is a system that has been generally adopted by gunmakers of all countries and in all periods since the introduction of rifled arms, and is that which is adopted at the Royal Small Arms factory, Enfield, in the manufacture of rifles for the army and navy.

“Second—*The Elliptical or Oval Bore*.—The distinctive character of this system, as adopted by Mr. Lancaster is, that the barrel is cut in its interior in the form of an ellipse, the difference between the major and minor axes being .012. The barrel being a smooth bore is easily cleaned; there are no recesses for the collection of fouling, and the bullet does not act upon the air with any sharp edges.

“Third—*The Polygonal System*.—This has been adopted by Mr. Whitworth in the construction of his rifle, the bore of which is hexagonal and measures across the flats, i.e., the minor diameter, .451, and across the angles, i.e., the major diameter, .503 inch; and by Mr. Westley Richards in his breech-loader, the bore of which is octagonal; also by Mr. Henry, of Edinburgh, the bore of whose rifle is heptagonal, with a rib in each of the angles.”

It must be borne in mind that the form of projectile employed is a matter of the greatest importance. On this point the text book says:—

"The velocity (initial) of a round shot is greater than that of an elongated one of the same diameter, taken transversely. Suppose the transverse sections of two shot, one spherical the other elongated, to be the same, and also the resistance, then the elongated projectile has much greater weight to overcome the resistance, or in other words the resistance is distributed over a greater number of particles, and its effect upon each particle is less than that upon the fewer particles of the spherical shot. Now although the spherical shot may have a much greater initial velocity than the elongated, yet it experiences a much greater retardation, and its velocity is much more rapidly diminished, the result is that the flight of the spherical shot is considerably less than that of the elongated shot, which latter travels at a more uniform speed throughout its flight."

On the subject of breech-loaders I may quote from the text book as follows:—

"The advantages of breech-loaders are, 1st, celerity of fire; 2nd, easy loading in any position; 3rd, they are generally more easily cleaned and examined.

"Any breech-loading gun which can, by accident or design, be fired before all its parts are properly in place, is a defective and highly dangerous arm to those who use it, and totally unfit for any practical purpose in warfare.

"The disadvantages of breech-loaders are, 1st, the disposition of the gas to escape at the breech; 2nd, a tendency to a waste of ammunition; 3rd, they generally cannot be loaded with loose powder; and 4th, they do not shoot as strong as muzzle-loaders.

"Breech-loaders, as a rule, require a special cart-ridge. The escape of gas round the joint at the breech is generally prevented by placing a wad at the base of the cartridge, which consequently rests against the breech, and receives the force of the explosion, whereby it is detached from the cartridge and retained in the barrel. This wad, on the introduction of the next cartridge, is pushed in front of the bullet, and in its passage out tends to clean the barrel.

"The breech-loading arms in general use are as follows:—Prussian needle gun, *Zündnadelgewehr*; Green's and Prince's, barrels move forward, junction behind the cartridge; Sharp's, junction behind the cartridge, breech drawn down by the trigger-guard; Calisher and Terry's, junction behind the cartridge, the barrel projects above the stock, breech moveable by a backward motion; Storm's, junction in front of the cartridge; the chamber to receive the charge hinges on the upper part of the barrel, and is turned back towards the muzzle to load; Westley Richards', junction behind the cartridge, breech moveable by an upward motion.

"Within the last six years breech-loading carbines on Green's and Sharp's principle, both Americans, and Westley Richards', of Birmingham, have been issued to some of our cavalry regiments, all of which, Lancers excepted, are to be armed with the Westley Richards breech-loading carbine. One thousand Westley Richards' breech-loading muskets were supplied to the Government in 1862, and have been issued in small numbers to several battalions for practical trial.

"The difficulties attending the construction of breech-loaders are chiefly mechanical, and that of closing the breech effectually to prevent the escape of gas is the principal. This, however, has been overcome in some systems, first by Colonel Green, of the United States army."

Colonel Wilford explained verbally, at considerable length, the construction of the various forms of rifle, dwelling especially on that of Mr. Whitworth, of which he spoke in very high terms. He urged the importance of the breech-loader, particularly as affording facilities for loading in a recumbent position, and also for rapid firing in all positions. He insisted that the soldier was entitled to have placed in his hands the best weapon that could be produced; that the arm should not be, as it

were, lowered to the present capacity of the soldier, but that he should be raised by education and training to such a state of efficiency as to be able to use a weapon requiring delicate handling and careful management.

In conclusion, Colonel Wilford pointed out how important it was, in the interests of peace, that our army should be brought to the highest state of efficiency. The object of our military organisation now was not to provoke war, but to prevent attack. This remark of course especially applied to the volunteers; and he observed that, in his opinion, that great movement would, to some extent, have failed in its object, if the volunteers were ever called upon to fire a shot.

DISCUSSION.

Mr. C. F. DENNET, after expressing the interest he had felt in Colonel Wilford's paper, said it was to this Society, as the originator of the Great Exhibition of 1851, that was due the great progress that had been made in the manufacture of fire-arms in this country, for in that Exhibition the display of fire-arms in the American department drew attention to the subject, and led to the introduction of machinery into this country for their manufacture, besides getting rid of the protective laws which hitherto had so much fettered progress. In December, 1851, he (Mr. Dennet) received from Colonel Sam. Colt, then embarking for America, authority to act as his agent in this metropolis (which he did for 12 years until his decease) for the manufacture and sale of his fire-arms. The capital to start with was only fifty pounds. After taking premises for carrying out the works, it was discovered that the importation of machinery was prohibited, as well as the sale of foreign arms. Nothing daunted, however, with the encouragement and efficient aid of Mr. Charles Mapby, he applied to the Lords of the Treasury, asking leave to import and use American machinery in the manufacture of the revolver. He was received with politeness, but met with a decided refusal. During the discussion with the Treasury in 1852, the Kaffir war broke out, and the few "new fangled" weapons which Col. Colt had given to the lancer regiment embarking for the Cape had been tried with success. Officers had learned the use of the arm and its value in contending with a treacherous enemy. The demands for them became frequent and increased. But he was not allowed to sell them. They were foreign. Those left over from the Exhibition were locked up in the Custom-house, and it was necessary for an applicant to write to the Treasury requesting their lordships to grant them "the favour of purchasing of Colonel S. Colt, or his agent, one of the Colt's revolvers now at the Custom-house, on payment of a fixed duty thereon." With the official reply in his hand, the purchaser finally got his pistol, and his name was duly gazetted. These requisitions becoming too frequent, the Treasury at length gave him permission to import the necessary machinery. 30,000 pistols were immediately put in hand, and, for the first time in the history of British manufactures, all the materials of the weapon—metal, wood, &c., went in at one door and came out at another finished pistols—wholly made by machinery. The Kaffir war had gone on, the Crimean had begun—the demand was increasing. He could sell his "Colt's" without difficulty. There was no prohibition against exportation; and before he received an order from this Government he had supplied 5,000 to the Egyptian Government. Admiral Plumbridge, who saw by accident some officers of the 15th trying their Colt's revolvers against "Brown Bess," at Portsmouth, was his next patron. He had been made a convert by seeing the pistol beat the gun; he came to town, made requisition through the Admiralty for the next large demand, which was 9,000, and took them to the Baltic. After three years' experience the value of this arm became thoroughly acknowledged, and the Government sent commissioners to America to

examine the works at Springfield. This ultimately resulted in the establishment of the Enfield factory, although some were still found to say, before a Parliamentary Committee, that the manufacture of arms by machinery was impracticable. It then became a mania to make fire-arms. Since the year 1851 more patents for fire-arms had been taken out than during the whole fifty years previous to that date. With reference to Colonel Wilford's paper, he begged to differ from him as to the merits of the Enfield rifle, a weapon which, in his (Mr. Dennet's) opinion, was capable of being made to shoot with wonderful accuracy; indeed, he thought it was surpassed by no other rifle, though he did not wish to detract from the merits of Mr. Whitworth, who had doubtless done much by the improvements he had introduced.

Mr. C. F. T. Young said he believed the invention of the expanding bullet was due to Capt. John Norton in the year 1818, and it was first applied in England in the year 1823. It was mentioned by Sir Richard Airey that in that year this form of bullet was exhibited at Woolwich in his presence.

Capt. J. SELWYN, R.N., rose to express the very deep debt of gratitude which he felt they all owed to instructors in musketry in general, and to Col. Wilford in particular. Col. Wilford had touched upon one subject of the highest importance. He had recognised the fact that certain proceedings had taken place which indicated extreme stupidity on the part of those who conducted our public affairs twenty or thirty years ago, but did not point out how we might guarantee ourselves against the recurrence of such stupidity. Those who should be the judges in these matters were often inventors themselves, personally interested in special forms of the weapons which they were called to pass judgment upon, and therefore there was not that free and unbiased judgment from which alone we could obtain the best weapon with which to arm our troops. Colonel Wilford had said that successful shooting depended more upon the ammunition than on the weapon itself; but in his praise of the Whitworth rifle this had been put out of view. Now, he (Captain Selwyn) would engage to take an ordinary smooth-bore musket—with a bullet, it was true, of very different shape—a cylindrical bullet, open from end to end, internally grooved, and deriving its rotation from the air in the most perfect manner—and giving 300 yards greater range than the best rifle now existing, and with the same charge and the same elevation, would give equal accuracy, with greater velocity and less strain on the gun. The device of rifling had resulted from the discovery that it was necessary to produce rotation of the bullet, but it must be allowed that that rifling must necessarily throw an increased strain on the piece, and must diminish the velocity with which the projectile left the weapon. This was equally true with large ordnance as with the musket. The bullet to which he referred was an open cylinder from end to end; it had no area of greater resistance to the air than the small elongated projectile. The air passed through it, and there was this remarkable fact, that there was no partial vacuum behind it, which every engineer knew contributed to the retardation of the flight of the projectile. The expanding plug bullet referred to favourably in the paper was, he thought, a doubtful success, for the plugs generally, if not fitted very tightly into the bullet, left the bullet within 200 or 300 yards of the target. He had himself gathered up large quantities of iron plugs which had fallen short. In modern bullets these plugs were omitted, and equal results were obtained by providing for the expansion of the lead into the grooves of the rifle. The next point he would touch upon was the statement of Colonel Wilford that correctness of shooting was impaired whenever the bullet was behind the junction of the breech chamber, in breech-loading guns, instead of absolutely at the base of the barrel. The fact was, however, that the barrel was the director of the bullet, and the chamber was merely the place where the power was

generated. It was thus clear it would take a considerable amount of eccentricity, such as they had no reason to apprehend from a well-fitted breech-loader, to diverge the flight of the bullet after leaving the barrel. The rifle which had received a large amount of praise from Colonel Wilford was the Westley-Richards rifle. He had seen and handled that weapon, and it required more motions, and more special ammunition, and he considered it had fewer advantages than many other breech-loaders. There was one principle which could not fail to be of value, and would apply to the whole question of breech-loading, viz., that the rifle must be made for the ammunition rather than the ammunition for the rifle. If then they made a perfect ammunition, and devoted their attention to causing the transmission of the bullet with as little loss of power as possible, and in a straight line, they would have fulfilled the necessary conditions. If, again, in making a rifle, they reduced the wearing points to a minimum, consistent with the maximum of effect, they would obtain a great advantage—and if grooving could be done away with altogether, preserving accuracy of shooting, he thought they would thus have the most perfect weapon. The public were exceedingly disappointed at hearing from the mouth of an officer of state that there now existed a system of taking up a single weapon, to the exclusion of all others that might be introduced—of merely improving upon that weapon till it came to be regarded as a perfect one, and then saying, "We have made such improvements in this that we will not look at anything else." This was neither fair nor statesman-like. On the contrary, let the best weapons be tested fairly, by officers who were known to be impartial, and who were not irremovable. Let those weapons, having passed a preliminary test, be subjected to the only really conclusive test, which was placing them in the hands of our soldiers. Let them be given, in sufficient numbers, to regiments in active service, or, short of that, to regiments where good ranges were obtainable, and let those rifles be fairly reported on. They would then know what rifle succeeded best, and that upon which they could confidently rely, before the order was given for the construction of a large number of them.

Mr. LANG, understanding Mr. Dennet to have claimed for Col. Colt the invention of the revolver introduced in 1851, begged to say that he saw an application of that principle to fire-arms as early as the year 1840.

Mr. DENNET explained that he had not claimed for Col. Colt the invention of the revolver, but that he had been the first to introduce the manufacture of small arms by machinery into this country.

Colonel WILFORD, in reply, said he did not consider himself competent to enter into the question of the manufacture of guns; but with regard to the Enfield rifle, it was a remarkable fact that it had never been employed in shooting for the Queen's prize, and he had thus a right to assume that this was because it could not do the work. He had spoken of the Enfield as it was, not as what it might possibly be made. When he spoke of the Whitworth rifle he did not give his private opinion merely, but the printed opinion of the authorities, coupled with the fact that that rifle had been, he believed, in every case used in the contests for the Queen's prizes; and with regard to the other leading rifles, they possessed the same principle of spirality and size of bore which were originally determined by Mr. Whitworth. With regard to what had fallen from Capt. Selwyn, he would say that the breech-loaders submitted to the authorities in which the junction was made in front of the ammunition were not considered so successful as those in which the junction took place behind the ammunition. He was aware of the imperfections of the Westley-Richards rifle, and had never regarded it as a perfect weapon. He did not question the fact of rotation being given to a hollow cylindrical bullet in the way Capt. Selwyn described, but he (Col. Wilford) had received dozens of plans and suggestions for bullets, the whole of which had failed. If the projectile referred

to by Capt. Selwyn was as successful as had been described, all he could say was, its merits were not as yet publicly known, and he should be delighted to find that it realised all the advantages that were claimed for it, and that its success with the smooth bore was established.

The CHAIRMAN said he was sure that all present had listened with the greatest pleasure and delight to the very able paper with which Col. Wilford had favoured them on a subject of such vital importance as the weapon with which our soldiers should be armed. He thought, whatever the judgment of the meeting might be in regard to the points of superiority of one weapon over another, there would be no difference of opinion as to the importance of giving our soldier the very best weapon that it was within the power of art to produce. It was of the utmost importance that the soldier should have full confidence in his weapon; and, with reference to the discussions which had recently taken place, he thought much that Col. Wilford had said must tend to reassure the minds of those who had been led to suppose that we were somewhat over-refining our system of infantry instruction. He believed it was most necessary that they should combine two things in the weapon of the soldier, viz., the power of coping with his enemy at a distance, and the power of closing with the greatest effect; and perhaps the most perfect soldier was he who combined the greatest amount of caution with the greatest amount of pluck. As an artillery officer perhaps it was somewhat presumptuous in him to offer an opinion on the subject of small arms; but from an experience of some thirty-four years, the greater part of which had been passed in the field, he had learnt to see the transcendent value of the rifle as a weapon. It happened that during the recent war in India he was closely associated in the field for months with a regiment just arrived from the Mauritius, and which was one of the first that had gone through the new course of instruction with the Enfield rifle. The men, on their first arrival, complained of the severe discipline to which they had been subjected during the previous six months by their commander, Major Simmonds, having been called out frequently twice a day for rifle practice for several hours together. A few days after these complaints ceased, for when they found themselves opposed to a force of the enemy twenty times their number, they discovered the value of the teaching they had undergone. The only way in which it was possible for so small a body to overcome the superior numbers opposed to them was by extending them in light infantry order, and making available the superiority of their fire. By this means they kept their formidable enemy at bay during the greater part of the day, till the opportunity was offered of charging with the bayonet, which led to a glorious termination of the day's struggle. Speaking of this action afterwards, the men confessed how great were the benefits of the severe system of teaching which they had gone through in the Mauritius, and he had no doubts such would ever be found to be the case. No one who had seen what the British soldier could do in the field, would have the least hesitation in supplying him with the very best weapon that could be turned out, and giving him the best instruction how to use it. The gallant Chairman concluded by proposing a cordial vote of thanks to Colonel Wilford for his very able paper.

The vote of thanks was carried by acclamation and duly acknowledged.

IMPROVEMENT OF DWELLINGS FOR LABOURERS AND ARTISANS.

The following is the draft of a bill which has been prepared under the direction of a Joint Committee of the Society of Arts and the National Association for the Promotion of Social

Science. It will be brought into Parliament by Mr. Charles Buxton, M.P. The bill is "To facilitate the removal of houses which are unfit for human habitation, and the erection of improved dwellings for artisans and labourers:—"

Whereas it frequently happens that the houses occupied by the labouring classes are unfit for human habitation, or pestilential, or a nuisance to the neighbourhood in which they are situate, and it is expedient that facilities should be afforded for the demolition of houses of that character, and the erection on the site thereof of improved dwellings for artisans and labourers:

Be it enacted by the Queen's most excellent Majesty, by and with the advice of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows (that is to say),

1. This Act may be cited for all purposes as "The Improvement of Dwellings for Labourers and Artisans Act, 1866."

2. In the construction of this Act the following words and expressions shall have the several meanings hereby assigned to them, unless there be something either in the subject or the context repugnant to such construction.

"The Secretary of State" shall mean Her Majesty's Principal Secretary of State for the time being for the Home Department.

"House" shall include any house, cottage, or other building used for human habitation, and any outbuildings, offices, yard, garden, curtilage, or land attached to or belonging to any such house, cottage, or other building.

"The Premises" shall mean any houses with respect to which the powers of this Act are put in force.

"Owner" shall have the same meaning in this Act as in "The Lands Clauses Consolidation Act, 1845."

"Municipal Corporation" shall mean the mayor, commonalty, and citizens of the City of London, and the mayor, aldermen, and burgesses of any borough acting by the council.

"Building Company" shall mean any society, company, or association incorporated under "The Companies Act, 1862," or by any special Act of Parliament or Royal Charter, for the purpose, either solely or amongst other things, of purchasing land, and building thereon.

3. "The Lands Clauses Consolidation Act, 1845," and "The Lands Clauses Consolidation Act, 1860," are incorporated in this Act, except the sixteenth and seventeenth sections of "The Lands Clauses Consolidation Act, 1845," and the provisions as to providing for access to the special Act, and save so far as any other of the provisions of those Acts respectively are expressly varied by or are inconsistent with the provisions of this Act.

4. Any municipal corporation or building company may apply to the Secretary of State for a certificate under this Act.

5. Such application shall be made by a memorial in writing, under the common seal of the municipal corporation or building company applying.

6. Every such memorial shall particularly describe the houses in respect of which the certificate of the Secretary of State is sought, and state the names of the owners thereof, so far as the same are known to the applicant, and shall also state that such houses are unfit for human habitation, or pestilential, and a nuisance to the neighbourhood in which they are situate, and the grounds for such abatement, and that the applicants are willing to pull down the same, wholly or partially (as may be requisite), and erect on the site thereof dwellings proper and suitable for artisans and labourers.

7. Every such memorial shall be accompanied by plans and specifications showing the mode in which the applicants propose to appropriate the sites of the houses mentioned in the memorial, and generally the works

proposed to be executed, and by an estimate, to be signed by an architect, of the cost of executing the proposed works.

8. Notice in writing, or partly printed and partly in writing, of any intended application to the Secretary of State for a certificate under this Act, shall be served on the owners of the houses in respect of which the certificate is sought, one calendar month before the application is made.

9. Where the residence or place of business of any owner of the said houses is known to the intending applicants, such notice shall be sufficiently served if the same is left at his residence or place of business, or sent by post in a registered letter addressed to him at his residence or place of business. Where any owner or his residence and place of business is or are not known to or after diligent inquiry cannot be ascertained by, the intending applicants, then the notice shall be sufficiently served if the same is left addressed to the owner with some occupier of the houses in respect of which the certificate is sought, or affixed on some conspicuous part of such houses, and a copy thereof is advertised in the *London Gazette*, and in some newspaper circulating in the district in which the houses are situated.

10. Any owner may apply by a memorial in writing under his hand, to the Secretary of State, in opposition to any application for a certificate under this Act.

11. Before proceeding to consider any application for a certificate under this Act, the Secretary of State shall ascertain whether the applicants have served the notices required by this Act, and before granting a certificate he shall take into consideration any representation made to him in opposition to the application.

12. The Secretary of State may require any evidence to be laid before him, on behalf either of the applicant for a certificate or of any opposing owner, as to any of the matters respecting which his certificate is sought, or in explanation or support of the plans, specifications, or estimates accompanying any such memorial as aforesaid, and may require any of the inspectors or other officers appointed under "The Local Government Act, 1858," to inspect the houses in respect of which a certificate has been applied for, and report as to the state thereof, and generally may direct such other inquiries to be made as he shall think proper.

13. The costs, charges, and expenses, of every such inspection and report and all such inquiries shall be borne by the applicants for a certificate, and the amount thereof to be fixed by the Lords Commissioners of her Majesty's Treasury, shall be a debt due to her Majesty.

14. The Secretary of State may either refuse any application for a certificate, or if he is satisfied of the following matters (that is to say):—

- (1.) That the premises described in the memorial presented to him by the applicants, or some part of them, are or is unfit for human habitation, or pestilential, and a nuisance to the neighbourhood in which they are situate;
- (2.) That dwellings proper and suitable for artisans and labourers are needed in that locality;
- (3.) That the applicants are in a position and have the means to execute the works referred to in the plans and specifications accompanying their memorial, with such additions thereto, or alterations and modifications therein, as the Secretary of State shall direct;
- (4.) That it is fit and proper that the applicants should have and exercise powers for the compulsory purchase and taking of the said premises or any part of them—

the Secretary of State shall make and issue a certificate to that effect under his hand, which certificate may be in the form contained in the Schedule to this Act. Such certificate shall also prescribe the period after the expiration of which the powers of the municipal corporation or building company named in the certificate

for the compulsory purchase and taking of the premises shall not be exercised, and may prescribe any other special terms and conditions which the Secretary of State may deem reasonable, under the circumstances of the case.

15. As from the date of the certificate the municipal corporations or building company named therein may enter upon the premises mentioned in the certificate, and take and use the same for the purpose of executing the works approved by the Secretary of State.

16. In the construction of "The Lands Clauses Consolidation Act, 1845," and "The Lands Clauses Consolidation Act, 1860," (so far as the same respectively are incorporated in this Act), any municipal corporation or building company to whom a certificate has been granted under this Act shall be deemed to be "the promoters of the undertaking," and the premises mentioned in the certificate shall be deemed to be "the lands by the Special Act authorised to be taken."

17. The Secretary of State may either approve the plans and specifications for the appropriation of the site of the premises, or may direct any additions thereto or alterations or modifications therein, and no subsequent alteration, modification, or addition shall be made in or to the plans and specifications as approved by the Secretary of State, without his approbation and consent.

18. No municipal corporation shall exercise any of the powers of this Act except with respect to any houses situate within the limits of their own city or borough.

19. Wherever two or more applications are made to the Secretary of State for a certificate under this Act in respect of the same houses, the Secretary of State shall have regard to the order in which the applications have been made, and shall not grant a certificate upon any later application, unless he is satisfied that he ought to refuse every earlier application; but if two or more applications are made on the same day, the Secretary of State may grant a certificate upon such one of such applications as he shall think best.

20. Every notice served by any municipal corporation or building company exercising the powers of this Act, in pursuance of the eighteenth section of "The Lands Clauses Consolidation Act, 1845," shall be accompanied by a printed copy of the certificate.

21. The municipal corporation or building company exercising the powers of this Act shall, within three calendar months after they shall have obtained possession of any part of the premises, proceed with all reasonable speed to execute the works shown on the plans and referred to in the specifications as approved by the Secretary of State; and if any such corporation or company shall make default therein the Secretary of State may authorise and direct any other person, association, or company, by themselves, their contractors, servants, workmen, and agents, to enter upon the premises, and execute the works, so far as the same shall be incomplete, and reimburse themselves all costs, charges, and expenses incident to the execution of such works, by the sale of the old materials, so far as the same may extend, or may recover from the parties making default the amount of such costs, charges, and expenses, as a debt, in any superior court of common law, and shall also have an express charge upon the premises in respect of such amount, which charge may be realised by a sale of the premises or any part thereof.

22. Until the works are completely executed, the municipal corporation or building company exercising the powers of this Act shall not sell, demise, or lease the premises or any part thereof, or transfer their liability to execute the said works, or part with their control over the execution thereof, to any person, association, company, or corporation, who shall not have been previously approved of by the Secretary of State for that purpose; provided that nothing hereinbefore contained shall prevent any building company raising upon mortgage of the premises or any part thereof any sums of money which they would otherwise be authorised to raise by

their Articles of Association, or the provisions of the Act of Parliament or charter under which they are incorporated; and any municipal corporation may, for the purpose of enabling them to execute the works, borrow from time to time such sums of money as the Secretary of State shall approve upon mortgage of the premises or any part of them, but no person advancing any money shall be bound to see to the application thereof.

23. Whenever the architect of the municipal corporation or building company (as the case may be) exercising the powers of this Act shall certify that the works are completed, the premises acquired by any municipal corporation under this Act may from time to time be sold, exchanged, mortgaged, charged, demised, leased, or otherwise dealt and disposed of, in like manner as any other land or premises, part of their corporate estate, but in cases where the approbation of the Lords Commissioners of her Majesty's Treasury, or any of them, is required for any such disposal, then only with that approbation; and the premises acquired by any building company may be dealt with and disposed of to such extent and in the like manner as any other property of a similar character belonging to such company may be dealt with or disposed of according to their articles of Association or the provisions of the Act of Parliament or charter under which they are incorporated.

24. The municipal corporation of any borough to which "The Public Health Act, 1848," has been applied, or which has adopted "The Local Government Act, 1858," may from time to time raise as part of the general district rate the monies which they require for the purposes of this Act, and may from time to time borrow by mortgage of the rate any sums of money, subject to the provisions as to borrowing on mortgage of the rate contained in "The Public Health Act, 1848," so far as the same are unrepealed, and "The Local Government Act, 1858," which provisions shall be deemed to be incorporated with this Act, and shall extend and apply to the monies to be borrowed under this Act, as if the same had been expressly re-enacted here.

25. All the monies produced by the mortgage, sale, or other alienation of any premises required by any municipal corporation under this Act, and the rents, issues, and profits of the premises so acquired, and not sold or aliened, and the monies raised by such corporation by the general district rate for the purposes of this Act, and the monies borrowed by such corporation for the purposes of this Act, and all other monies received by or to the use of such corporation, under the powers of this Act, shall forthwith after the receipt thereof be paid to the treasurer or other officer of the corporation whose duty it is to receive the monies belonging to the corporation, and carried by him to a separate account, and the same shall be applied in defraying all the expenditure and liabilities of such corporation, under the powers and for the purposes of this Act, including the expenses of lighting, repairing, and maintaining the premises, and any other expenses in respect thereof, and including the interest on any monies borrowed for the purposes of this Act; and the instalments of such monies which shall be presently payable, or (if it has been arranged to provide for the repayment of the monies borrowed by means of a sinking fund) the sums necessary for the formation of a sinking fund, and the surplus (if any) shall be carried to such sinking fund (if any), or be otherwise applied in paying off any monies borrowed for the purposes of this Act, and the ultimate surplus (if any) shall be carried to the credit of the general rate.

26. Every municipal corporation exercising the powers of this Act shall keep a distinct and separate account of all their receipts, credits, payments, and liabilities under this Act, and the provisions contained in "The Local Government Act, 1858," with respect to the audit of accounts in districts where the municipal corporation are the local board, shall be deemed to be incorporated with this Act, and shall extend and apply the receipts

and expenditure of any municipal corporation under this Act, as if the same were expressly re-enacted.

27. Any certificate purporting to be signed by the Secretary of State, and to be made and issued under this Act, shall be receivable in evidence by any Court of Justice, without further proof thereof, or any proof of the handwriting of the Secretary of State.

28. This Act shall not extend to Scotland or Ireland.

SCHEDULE.

"The Improvement of Dwellings for Artizans and Labourers Act, 1866."

[A short description of the premises intended to be taken.]

I, the Right Honourable Her Majesty's Principal Secretary of State for the Home Department, do hereby, in exercise of the powers given to me for this purpose by the above-named Act, certify as follows (that is to say),

[Here to follow the matters certified, in which the premises intended to be taken are fully described.]

And I prescribe as the period after the expiration of which the powers of the said for the compulsory purchase or taking of the said premises or any part thereof shall not be exercised. And I direct

[Here are to follow any special directions.]

Whitehall,

Dated this day of
(Signed)

Her Majesty's Principal Secretary of
State for the Home Department.

Proceedings of Institutions.

BIRMINGHAM AND MIDLAND INSTITUTE.—The report for 1865, presented at the annual meeting, January 8th, 1866, congratulates the members upon the steady progress made by the Institute, and speaks of the constant and steady increase in the numbers attending the various classes. The free library and the gallery of art are both completed, and, through the kindness of the Town Council, the Institute has on more than one occasion derived considerable advantage from having the latter room placed at its disposal. The central hall and staircase are also fully completed. In consequence of the completion of the free library, the specifications of patents have now been removed from the council-room to the central reference library; and the council has also placed the Institute collection of paintings in the gallery of art, on the condition that the Institute shall be at liberty to remove them, on giving one month's notice of its intention of so doing to the Town Council. Several valuable donations have been received during the past year. The number of members of the Institute is slightly diminished since the commencement of the year. The lectures delivered on the Monday evenings have been made as interesting and attractive as possible. It has been decided to establish a class in elementary chemistry, exclusively for the use of subscribers and resident members of their families. The number of public lectures given during the past year has been thirty-one, and the average attendance has been in excess of that of former years. Of these lectures two have been given gratuitously by Lord Lyttelton and the Rev. G. D. Boyle. Since the opening of the free libraries a large addition has been made to the number of persons visiting the museum; the numbers being 2,512 for the past year, as against 1,229 in 1864. The council has paid considerable attention to the re-arrangement of the museum. Considerable additions have also been made to the number

of papers supplied to the news-room. In the industrial department the number of students attending the various classes has largely increased, the total number of persons now receiving weekly instruction in connection with this department amounting to 1,067. The penny lectures given during the year have been generally well attended. The Rev. G. D. Boyle, Mr. Waterhouse Hawkins, Mr. Gausby, and Mr. C. J. Stevens, have kindly given their services in the gratuitous delivery of lectures in this department. The council has been enabled to establish a class for the study of geology. Upon the recommendation of the teacher of the arithmetic classes, the charge for admission to the advanced arithmetic class has been changed from a quarterly payment to one of a penny on admission to each lecture. This change has been attended with complete success. The council regrets that the financial condition of the Institution is not so satisfactory as it appeared to be in the accounts presented at the last annual meeting. There is a deficiency in the general department of £191 2s. 2d., which is mainly caused by the exceptional outlay incurred in painting the building, the cost of which was £163 18s. 5d. In addition to this will be found, for the first time in the accounts, an item for property tax and inhabited house duty amounting to £40 12s. 6d. The council has endeavoured, by an appeal to the commissioners, to obtain relief from this charge, but has only succeeded so far as to reduce the amount, and the funds of the Institute will henceforth have to bear this serious burden. The council has resolved to co-operate with other public bodies in calling the attention of the government to the subject of the inhabited house duty, with the view of obtaining an exemption for such parts of the building as are not actually occupied for the purposes of residence. The increase in the number of students has caused a corresponding augmentation of the class fees received, but this has been more than counterbalanced by additional expenses, and the accounts of the industrial department show a deficiency of £137 16s. 6d. The total deficiency on the two accounts therefore amounts to no less than £328 18s. 8d. The reports of the class teachers in the various subjects—Chemistry, experimental physics, arithmetic and mathematics, elementary singing, French, English grammar and composition, botany, writing, German, practical mechanics, English history, geology, and the English language and literature, are generally most favourable.

NEW ZEALAND EXHIBITION.

A copy of the reports and awards of the jurors of this exhibition has recently come to hand, forming an interesting and highly creditable volume of 540 pages, containing a mass of valuable information. Adverting first to the mineral products, it is stated, as a matter of congratulation, that this class received a large amount of attention from exhibitors. When the vast value of mineral resources is considered, it becomes a matter of the utmost importance, particularly in a new country, that their existence should be ascertained, and their extent, variety, and character made known. The possession of valuable minerals is one of the richest endowments of a country, and without it no country can hope to take a place amongst the great and powerful nations of the world. To Englishmen, who of all others carry with them, wherever they go, the habits of active industry and commercial enterprise which have raised Great Britain to its present position amongst the nations, it is a matter of necessity that the country in which they seek to erect another England should contain within itself those natural elements which are necessary for the support of commercial and manufacturing prosperity.

That New Zealand has been amply endowed by nature with the possession of valuable and necessary raw material was fully shown by this exhibition, and in nothing has she been more bountiful than in the mineral treasures which are so widely distributed over the colony.

To make known the extent and value of these gifts was one of the chief purposes of the exhibition, and this aim has been accomplished to an extent that few could have anticipated. In these days of restless commercial activity and ceaseless and never-satisfied demands of manufacturing industry, no useful product can long remain neglected when once its existence is authenticated. Circumstances may, in some instances, delay the period of utilisation; but as colonisation proceeds and population increases, will come the demand for new channels of industry, and the arts and manufactures will assume daily increasing importance. The day may be distant when the forests and fertile plains of New Zealand will resound with the clang of the forge or the hum of the factory, and the midnight glare of the furnace illumine the surface of her lakes and rivers, but it is no mean thing for the colonists to know that they have at their hands the elements which will set in motion and force those great engines of civilisation.

New Zealand possesses all the principal minerals and metals, besides a great variety of those of less importance. The following is a list of the most important, a glance at which is sufficient to show how favourably circumstanced the colony is in its mineral resources:—

COAL.—A country without coal is deprived of perhaps the most powerful agent of civilisation. In these days of steam-engines, steamboats, and railways, on the use of which we are so much dependent for commercial intercourse and the provision of innumerable wants, coal, the prime mover of all this vast machinery, is an absolute necessity, and if it be not produced within our own country, we must draw our supplies at great cost from other places. It is a fortunate circumstance that, with few exceptions, wherever important British colonies have been founded, there has also been found a local supply of coal. Thus the colonists of that race which above all others has attained great national prosperity by means of its vast mineral wealth, will find in their new countries the same agents by which to build up a like greatness. New Zealand is, fortunately, no exception to this rule. Coal has been found to exist in immense quantity widely distributed all over the colony. As yet the absence of cheap means of transit, the dearth of labour, and want of capital, have prevented any extensive development of the coal-fields of the colony, but it cannot be doubted that these drawbacks will decrease with the progress of settlement and the increase of population, and the coal deposits of New Zealand will prove a source of national wealth.

COPPER.—This valuable metal is found in various parts of New Zealand; ore of rich quality was discovered years ago on the Great Barrier Island. Very pure samples of copper ore were exhibited in the Nelson department, some of which were of extraordinary richness. Important discoveries of copper ore have been made in Otago, the ore in some instances being of very rich quality.

CHROME.—This useful mineral has chiefly been found in the province of Nelson, at the Dun mountain, where it has been extensively worked. The quantity of chrome exported from New Zealand amounts to about 5,000 tons. Chrome is extensively used in the arts for making pigments. From it also is made chromic acid, a valuable agent in bleaching and dyeing. Owing to the lessened demand in England for this mineral, the price has fallen from £10 10s. per ton to £5, and at the present time it is not found remunerative to work the mines in the colony.

GOLD.—If New Zealand can boast of its deposits of the baser metals, it can also lay claim to the possession of some of the richest gold-fields in the world for the area they occupy. The wondrous impulse which gold discoveries give to colonisation, and the extraordinary commercial progress which they induce, have been strikingly manifested in modern times. California, Australia, British Columbia, and New Zealand, all afford instances of the wonderful effects which are produced by the development of auriferous deposits. As agencies in colonisation, gold disco-

veries exercise a gigantic influence. They draw population, lead to the opening up of distant wils to civilisation, and carry in their wake all the industries necessary for the progress of a numerous population. In New Zealand gold has effected transformations impossible under the ordinary process of colonisation. Busy and thriving populations are in a few weeks planted in localities previously remote and unknown. Tracts of country which under other circumstances would rest in primeval desolation for many years, become suddenly thrown open, and prosperity, rapid and brilliant, is created. All this is still being done in New Zealand, and the progress of discovery is gradually revealing the existence of rich auriferous deposits in almost every part of the colony. An obelisk in the exhibition represented 103 cubic feet of solid gold, being the quantity exported from April 1st, 1857, up to the 31st December, 1864, 1,749,511oz., of the value of £6,771,730; up to the 31st March, 1865, the total was £7,054,544.

IRON is exceedingly common in various parts of the colony in the form of magnetic iron sand. Clay iron ore, carbonate of iron, and red hematite are found in considerable quantities in the colony.

SILVER has only as yet been discovered in small quantities in New Zealand, and generally alloyed with other metals.

LEAD has been found in the provinces of Nelson and Otago.

MERCURY has been discovered in the form of cinnabar, but has not yet been found *in situ*.

EXCELLENT BUILDING STONE is found in every part of the colony. Plumbago has been found in quantity in the province of Nelson, where it occurs in thick beds interstratified with metamorphosed slate.

SULPHUR exists in immense quantity at White Island, a volcanic island on the east coast which is covered with it. No attempt has yet been made to turn these deposits to commercial account, although there cannot be a doubt that at some day they will prove of great value. Gypsum is found in various parts of the colony. From the oxide and silicate of manganese valuable preparations used in various processes of dyeing are manufactured.

HORSE EXHIBITION IN PARIS.

It is well known in England that great attention has been paid of late to the breeding of thoroughbred horses for racing purposes; but the same attention is also, wisely, being given to the improvement of half-bred and other horses for general purposes. Exhibitions of horses have taken place in many of the departments; in fact, these animals are now included in most regional agricultural shows, and last year there was an exhibition of the kind in Paris. An extremely fine collection has recently been on view in the Palais de l'Industrie. The exhibition was peculiarly interesting, from the completeness of the arrangements and regulations. It was organised by the Société Hippique Française, the members of which are amongst the most distinguished persons in France, the list of the founders being headed by the names of the Emperor, the Princess Mathilde, the Prince Napoleon, and Prince Joachim Murat. The committee of the Society has for its president the Marquis de Mornay. The horses were divided into five classes, and the medals and premiums to be awarded were sixty-one in number, and of a total value of 50,446 francs. There were, moreover, two grand medals of honour, without any money premium attached.

The following are the classes established by the committee:—

1st Class. Horses for large carriages and for posting. This class included 72 specimens.

2nd Class. Horses for light carriages, whether with two or four wheels. There were 110 horses exhibited in this class.

3rd Class. Saddle-horses. This included 39 animals.

4th Class. Horses, cobs, and ponies, from four to

seven years of age, and less than 15 hands high; these numbered 27.

The 5th class, or extraordinary prizes, included one of 3,500 francs for the most remarkable pair of horses, both in harness and for the saddle; one of 2,000 francs for the best single horse both for riding and driving; one of 1,500 francs for the most remarkable saddle-horse; and one of 1,000 francs for the first small riding-horse, cob, or pony, trained also either to double or single harness.

The two Prize Medals of Honour were for the best and second best stable of five horses or more, between the ages of four and seven, and of any size. The Emperor contributed, in competition for these prizes only, five carriage-horses, sixteen posting-horses, twenty mares of Norman origin for posting, three saddle-horses, and three small carriage horses. Twelve horses of the Cent Gardes were also entered for the Medals of Honour. The Imperial Cavalry School of Saumur also exhibited, but not in competition. The number of animals in the exhibition was 357 in all.

The whole of the central portion of the Palais was laid with sand, and reserved for the trials of the horses before the jury. Each exhibitor might ride or drive his own horses if he thought fit, but the jury might also repeat the trial with its own men. The exercises were laid down as follows:—For horses either in single or double harness—describing the figure of 8, walking and trotting; long trot, and backing. For saddle-horses—once round the ground, walking and trotting, both to the right and left; describing a circle in the same manner; cantering round the ground to the right and left, and describing circle; galloping round and backing.

The exhibitors paid five francs entry for each horse, and all the expenses of their conveyance to and from, and their food while at the exhibition; the Society undertook the cost of superintendence, and arranged for the supply of fodder, and veterinary attendance within the building, at a fixed charge, deducting five per cent. from the premiums as a contribution towards the general expenses.

REWARDS IN AID OF ADULT EDUCATION IN FRANCE.

The extension and improvement of the courses for adult education are being aided by various means; a few months since the Imperial Government allotted eighty-nine gold medals for the encouragement of the teachers of these useful classes, and the example has been followed by a considerable number of official and private personages. The Duc de Persigny has founded a special medal to be bestowed on the best teacher in the department of the Loire; the Minister of Public Instruction has created five medals of a hundred francs each; and nine medals of fifty francs each have been given by the three chief officers of the same Ministry; M. Haeutjens, deputy for the Sarthe, has placed five medals of the value of 100 francs, and five of 50 francs, to be given to the ten most successful teachers in that department; three other deputies have founded rewards of the same kind in their departments; M. Adolphe Moreau, Maître des Requêtes, has subscribed for one medal, value 300 francs, to be given to the best instructor, and two medals of 100 francs each to be contested by the pupils in the schools of Fère en Tardenois, in the Department of the Aisne, for five years; and M. Le Ray, a member of the Conseil-General of Mayenne, has established an annual medal to be given to the most successful instructor in that place; fifteen medals of 50 francs each, and two others, of the same value, have been contributed anonymously by two persons. MM. Godchaux, publishers, have placed 5,000 writing, and as many geographical, exercise books at the disposal of the Minister; a lady, who founded a school at Mayenne, has left by will 4,000 francs for the lighting and maintenance of the class of adults; M. Paul Dalloz, the director of the

Moniteur, has contributed five medals of the value of 100 francs each; six other medals of the same value have been distributed by deputies and others—lastly, the firm of Pleyel, Wolff, and Cie., piano-manufacturers, have subscribed the sum of 200 francs, for four years, for the creation of four medals of 50 francs.

It should be observed that the word "medal" is invariably used in such cases, but that the reward is always given in money when preferred. These generous subscriptions in aid of the efforts which are being made to remove the stigma of ignorance, even in the case of the adult members of the present generation, and give France a high position in the educational scale of nations, deserve mention on their own account; and they may, moreover, effect some further benefit in the way of example.

The State holds out other inducements to young men to shake off the imp Ignorance; the directors, superintendents, and principal assistants in the tobacco factories and other establishments under government, are all taken from amongst the pupils of the Polytechnic School, but there is an inferior, and also a supernumerary class, the members of which are appointed after examination; thus is announced a competitive examination, to be held shortly, for the admission of young men into the service of the twenty-four state tobacco factories. The candidates must not be less than twenty-one or more than twenty-four years of age, unless they have served four years or more in the army, in which case twenty-eight is the maximum age, and they are submitted to written and oral examination, the former consisting of French dictation (fair copy of the same), the writing of a letter on a given subject, questions in the geography of France, arithmetic, plane geometry, and measurement; the oral examination includes a few questions in French grammar and geography, arithmetic and practical geometry. These supernumeraries may be admitted to the grade above them, if—after five years of service, and before the age of thirty-five—they can pass a more severe examination in practical matters.

ORCHID TEA.

Mr. John R. Jackson, writing to the *Gardener's Chronicle*, says:—To have to look to the Orchid family for any large staple articles of trade other than Vanilla, would be not only to look to a new field, but also to a very interesting one. The application of the leaves of one of these plants as a substitute for tea has lately come under my notice. The product has been heard of before in its native country, but never, so far as I know, in fashionable or civilised society. It has, however, now made its appearance in Paris as a regular article of trade, and is highly recommended as a most agreeable beverage.

The plant yielding this new description of tea is the *Angraecum fragrans* of Thouars, an epiphytal orchid of the Island of Bourbon, where it is known and used by the natives under the name of "Faham." This word, once an obscure native name, is now, if we are to believe the enterprising French firm who has just introduced it, destined to become a "household word," for "Faham" is the name under which it is now sold in Paris, and the word appears in large letters upon the boxes in which it is packed, as well as upon the circulars accompanying them. The headings of these circulars run as follows:—"Faham from the Isle of Réunion, imported from and manufactured at Réunion." There is also a rough, but not at all a bad cut of the plant producing it. The circular itself begins by saying that tea proper has never been well received in France, owing to the wakefulness resulting from its use, which has caused many persons to reject it altogether, while many of those who do use it drink it in default of a better substitute. The circular then goes on to state that it is for the purpose of remedying this state of things that the new infusion is intended; not to replace tea, which has indisputable advantages,

but to afford an opportunity of choosing between two beverages, equally beneficial and useful. "Faham is not a new production. From time immemorial the natives of the islands of Réunion and Mauritius, though situated as it were at the very gates of China, have preferred it to tea; every traveller has partaken of their preference; one of our most illustrious writers, George Sand, eulogises it in the midst of the fine description which she gives of the Isle of Bourbon, an eulogy which cannot be suspected of puffery, inasmuch as it was written upwards of 30 years before the introduction of Faham into France was thought of. Every work on botany of any importance similarly places it in the foremost rank of the beneficial productions of this favoured clime. The difficulties experienced in the gathering and manufacture of Faham on a large scale, and consequently the almost impossibility of procuring a sufficient quantity to recompense the labour of obtaining it for consumption, and also its very high price, have alone prevented until now this valuable article of diet from being imported into France. After many fruitless attempts, these obstacles have been overcome.

"Faham belongs to the family of orchids; it grows upon the high slopes of the Island of Réunion, in the midst of almost inaccessible forests. It possesses a taste differing greatly from that of tea, and is preferred by the majority of persons who have tasted it. It can be used as a substitute for tea on all occasions, as it combines its tonic and digestive qualities, free from the sleepless effect. It possesses an aroma of great delicacy, capable of being rendered more or less pungent according to the quantity used, and it gives forth a most agreeable perfume; after being drunk it leaves a lasting fragrance in the mouth, and in a closed room the odour of it can be recognised long after. This beverage has the further advantage over tea, which requires to be drunk at the time of making, that it can be reserved for a future occasion if requisite, and may either be taken cold or made hot again. Milk, or spirits in small quantities, especially rum, serve to develop its aroma, and, lending it additional delicacy or greater strength, render it a delicious drink. Lastly, this valuable plant is made use of to flavour custards and ices, to which it communicates its delicate fragrance.

"To be taken as a warm beverage, the leaves and stalks should be placed in cold water in about the proportion of one gramme to a tea-cup, more or less, as the consumer may desire it of a greater or lesser degree of strength. The water should be immediately made to boil for about the space of ten minutes in the tea kettle or other closed vessel. It should then be emptied into the tea pot or tea cups and sweetened accordingly."

A sample of this new kind of tea has recently been received at the Kew Museum; it was packed in a very neat canister-shaped box, similar to those now sold in Paris. These boxes are of two sizes, the smaller containing material sufficient for making 50 cups of Faham, and sold at 2*fr.* 50*cs.*, and the larger 105 cups, and sold at 5*fr.* Upon opening the box in question the perfume emitted was exceedingly powerful, and very similar to that of the Tonquin Bean. The leaves, unlike those of tea, appear simply dried, not shrivelled by heat, but are as flat as we should find them in any herbarium. The absence of any artificial colouring matter, or roasting, accounts for the very light colour of the infusion.

No doubt there are many persons who would prefer the fragrance of this article to the aroma of Chinese tea, but for my part I give preference to the latter—perhaps prejudices may have something to do with it. The perfume from the teapot is certainly very agreeable, and is an undoubted novelty; and if Faham came into general use, this domestic article would serve the twofold purpose of a teapot and a "perfume vaporiser." Doubtless if these leaves can be obtained in quantities sufficient for consumption as tea, the French perfumers might also import them to advantage, if for no other use. Powdered they would make excellent sachets.

In the Museum at Kew are some cigars made of the leaves of *A. fragrans* simply rolled in a t in tobacco leaf. They are probably very agreeable smoking, but I am unable to say if this application is a common one in the Island of Bourbon, or whether these specimens are rather a curiosity.

Fine Arts.

ART JURISPRUDENCE.—A question of some importance to dealers and connoisseurs in pictures was tried the other day before the Tribunal of Commerce of Paris. M. Jarvès purchased three pictures reputed to be by Leonardo da Vinci, Luini, and Giorgione, for the sum of sixty thousand francs, of which half was paid in cash and the rest by a bill on a banker. The purchaser, after having kept the pictures in his possession for seven months, declared that they were not painted by the masters to whom they were attributed, and demanded the return of the money paid, the cancelling of the bill given, and five thousand francs damages in addition. It was urged that the works were really not by the painters named, and the impression seems to have been that that view, in one case at any rate, was correct, but the court gave judgment against the plaintiff on the following grounds:—That the purchase was made without any reservation; that such a claim against the vendor could not be maintained unless it were shown that he had committed error or fraud to the prejudice of the buyer; that there was no question that the pictures delivered were those which had been purchased after long and careful examination; that, as regarded the work said to be by Leonardo da Vinci, “the indication of a picture attributed to a master did not include any idea of the originality of the work, but, according to usage in such matters, left the purchaser the liberty of appreciating its value at his own risk and peril; that it was for him to judge of its merit without demanding any guaranty but that of its identity with the work purchased and delivered; that, as regards the two other pictures, it was affirmed by experts that there were retouches or repaintings apparent, but that such was commonly the case with works of that date; that the purchaser might have ascertained the fact for himself, and that it did not prove the falsity of the origin attributed to them by the defendant; that it appeared, on the contrary, that for more than fifty years these pictures had formed part of various galleries, and had been admitted and preserved as being the works of the painters to whom they were attributed.” The sale was, therefore, declared to have been made under valid conditions, and the demand of the plaintiff rejected with costs.

SEVERE TESTS IN ART EDUCATION.—The competitions for the *Grands Prix de Rome* in the *École des Beaux Arts* of Paris, were to take place during March and April, and it will be useful to give an account of the very severe tests to which the candidates are subjected. Class of Painting:—The pupils have in the first place to make an original sketch in oil, and afterwards to produce a rough picture after their own ideas—each of these has to be accomplished at one sitting; those who pass successfully through the two preliminary trials are admitted to the competition for the grand prize, and have to produce a finished sketch of a classical subject supplied to them; the time allowed for this work is seventy-two days, commencing this year on the 24th of April, and finishing on the 19th of July, Sundays and fête days not being included. During the whole of these seventy-two days, each competitor works in a loge, or small studio, to which no person whatever is allowed access; the candidates take their meals at a table provided for them, and no conversation on the subject of the competition is allowed, each pupil being thrown entirely on his own resources. Class of Sculpture:—The pupils in this class have to produce a rough original sketch, secondly a model of figures,

and lastly, to produce a group of a given subject; for the last-named seventy-two days are allowed, on the same conditions as those named above. Class of Architecture:—The general conditions are the same, an original sketch, the same worked out roughly, and lastly a complete set of drawings, plans, elevations, and details, coloured, on a given subject, such as a theatre, a hôtel de ville, or other public building, for which one hundred and seventeen days are allowed. Classes of Line Engraving, and of Medal Engraving and Die Sinking:—Three tests as before, ninety days being allowed in the former, and ninety-six days in the latter for the final test. The sixth grand prize is for Music, and the competition is conducted on similar principles. It will be admitted that this system is a most severe one as regards the competitors, who must not be more than twenty-four or twenty-five years of age; the judges are the members of the Academy of the Beaux Arts, and the whole of the works of the competitors are exhibited publicly after the prizes have been awarded. A considerable number of the first artists in France have won the *Grand Prix de Rome*, but many young men have earned the same honour and never made any reputation afterwards; and there are many persons who are of opinion that these successful *tours de force*, executed under such extraordinary circumstances, are rather evidence of certain constitutional qualities of the mind and body than proofs of true artistic temperament and originality. The selection of the subject for the final test, and the fact of that subject being drawn from classic history, are among the points in the competition which find least favour; and although equitable decision would thereby be rendered infinitely more difficult, there are many persons, whose opinions deserve attention, who would leave the competitors free, not only as regards their means and methods, but also as regards the subject of their labours. But the conduct of competitive examinations in art is a most difficult question, and the only feasible method of meeting all objections would seem to be to bestow the prizes, not on those who produce the best rendering from the given subject, but upon those who won the highest in that and original design taken together. At present the tendency of the French school seems certainly more towards able reproduction than originality of thought and design.

Commerce.

BEET-ROOT SUGAR.—MESSRS. Arnold Baruchson and Co. say that a great breadth of beet will be sown this year in France, and this is not to be wondered at, as, even in less favourable seasons than the last, the cultivation of beet remunerates the farmer far better than that of wheat, or of any other agricultural produce. Contracts for the root have already been made by the manufacturers, at equal to 15s. per ton. The production per statute acre on good land during the late season has been from 20 to 24 tons, and the manufacturer has extracted from the root from 7 to 8 per cent. of sugar. Eighteen new manufactories are now being erected in France, which will bring the number up to 437. The quantity of beet sugar manufactured up to the end of February amounted to 242,000 tons, against 141,000 at the same period last year, and 20,000 to 25,000 tons are still likely to be produced (mostly of the browner sorts), making in all between 260,000 and 270,000 tons. There remained in the entrepôts, on the 1st March, 1866, 63,000 tons, against 39,000 tons last year. The stocks of cane in all the ports were at the same time 33,000 against 34,000 in 1865, and 53,000 in 1864. In the Belgian sugar districts 30,000 tons were produced, making in all, in round numbers, 300,000 tons in the two countries. In 1855-56, 275 manufactories produced only 90,000 tons, but the constant discovery of new appliances and of improved methods enables the manufacturer

to extract a larger per-centage, and a superior quality, from the root. There has been some activity in beet sugar in the Zollverein during the past month. Parcels of strong low qualities have been purchased for the United Kingdom, and the better medium sorts for the inland refineries. The fine white crystallised sorts have been readily taken by Russia, the only country in Europe which has suffered from a deficient crop. The out-turn of the crop will be a full average, both in the Zollverein, Austria, and her possessions. The consumption, however, might keep better pace with the production, seeing the small quantity these countries consume in comparison with the United Kingdom, in which latter is absorbed per head nearly three times as much as in France, four and-a-half times as much as in the Zollverein, and sixteen times as much as in Austria. In this latter country the use of sugar last year has diminished from $3\frac{1}{4}$ lbs. to $2\frac{3}{4}$ lbs. per head. Fourteen new factories are being erected in the Zollverein. It is calculated that not less than 600,000 tons of beet sugar have been produced in Europe this season.

COAL IN CHINA.—Extensive mines of coal exist in the mountains to the north-west of Peking. It costs about 16s. per ton at the pit's mouth, and more than double this amount per ton is paid for transport to the coast; but the mines are worked in the rudest way, and the little coal that finds its way from the western ranges to Tien-tsin is conveyed on mules or camels from the mountains to Tung-chow, or the Peiho, and thence down the river in boats to this port. From the mines in the northern range there is water communication of an indifferent character to Tien-tsin, but the quality of this coal is much inferior to that which comes from the western mountains. Here, however, is a great source of wealth, only waiting the application of European skill and capital to enrich those who undertake its development. There are three descriptions of native coal to be purchased in Hankow. One known in Chinese as dry coal, is retailed at about 600 cash per picul; and that known as smoke coal is quoted at about 750 cash per picul; and a third, which is called white coal, costs about 800 cash per picul. The dry coal is a sort of coke, and is admirably adapted for all household purposes. The smoke and white coal are well suited for and employed by steamers. Hankow is furnished with coal by the Hunan coal fields, the position of which can be determined by a glance at any ordinary map. By following from its source the river (the Hsiang-Kiang) which, rising in the Hsiao Ling mountains, flows northwards until it reaches the Tung-Ting lake, the district city of Kyang, will be found situated a short distance above the point where the north-east corner of Kiangsi cuts into Hunan. Here are the mines which supply the yen mei, or smoke coal. Proceeding north we reach the great mart of Hsiang Tan, situated at the junction of two branch streams with the Hsiang-Kiang. The more westerly of these streams flows past a city marked on the map as the district city of Syang-Syang, and it is in this neighbourhood that the ku-mei, or dry coal, is produced. Further north two larger tributaries, also from the west, swell the volume of the main river; thirty miles above this embouchure they unite, and at the point of union is the district city of Fyang, close to which are the hills which yield the pai-mei, or white coal, a description of anthracite. On the Yang-tze Capt. Blakiston saw no coal until he was forty miles beyond Chang-Fu, that is to say, over 440 miles above Hankow. According to the Chinese the coal produced in Sze-chuen and the western part of Hu Pei is inferior to that which comes from Hunan, a statement which would seem to be confirmed by the fact of Capt. Blakiston seeing at Sha Skit, about 190 miles above the outlet of the Tung-Ting lake, junks laden with Hunan coal bound upwards. Many are of opinion that coal should be found much nearer to Hankow; and during the past two years two foreign firms—one British and one American—have,

with the greatest perseverance, been endeavouring to trace its existence in the Ching-kow hills, ten miles above Hankow. The British firm has recently desisted, but the American firm still continues its researches. Many of the hills between Kin-kiang and Hankow present every appearance of being rich in immense treasures, more especially that fine range which terminates eighty-five miles below Hankow, in the picturesque bluff known as the Cock's Head.

Colonies.

PROGRESS IN QUEENSLAND.—The progress made during the past year in those staple productions which must form the basis of the wealth of this colony, has been most satisfactory. Although the extension of settlement has been going on at an unprecedented and rapid rate, the wet seasons rendered the three previous seasons anything but favourable to sheep farmers, and this was seriously felt by all but the occupiers of the very best runs, both the yield of wool and the increase of stock on all the older stations of a second-rate quality being much below an average. The seasons of 1865 were such as to produce a different result, and the present wool clip is expected to be by far the largest ever exported from Queensland; while the increase of sheep over the colony is also much more than in previous years, so much so, as to go far towards retrieving the position of many of the older settlers on an inferior country. Some of the stations, taken up since separation, have now been established long enough to participate in this benefit, and to give a good percentage of increase on stock. Tenders have been called for by Government, for a regular mail to and from the Gulf of Carpentaria, in order to provide for communication with the settlers there. The accounts from the extreme north are very favourable; the whole of Queensland, though a dry season has been experienced, has escaped the drought which has been so disastrous to the new settlements on the more northern portion of the continent. A new trade has sprung up in the export of fat cattle from Gladstone; and the increase of this description of stock is such as to induce the erection of boiling down establishments at various places on the northern coasts, where the distance from any market renders this wasteful course advisable. On the whole, although the indebtedness of the squatters must be enormous, the past year has added very largely to the wealth of the colony in this description of property, and has added to its power of producing an income in years to come. The success which attended the first cultivation of sugar on the shores of Moreton Bay, has led to the occupation of a large quantity of the land for this purpose, at different points on the seaboard, and numbers of capitalists are now engaged in planting the sugar cane on their estates, with every prospect of receiving a satisfactory return for their enterprise.

NORTH AUSTRALIA.—The settlement at Adams Bay is said to be a complete failure. This failure contrasts strongly with the rapid progress which is being made by settlers both to the west and to the east of that country. At the head of the Gulf of Carpentaria cattle and sheep are depasturing in large numbers. Squatters have found their way to good country, and are making it valuable. On the western coast the same process is going on, though Camden Harbour, which was an attempt at colonization too much in the style of Adam's Bay, has proved a failure. The mistake appears to have been the attempting to make a colony instead of inducing one to grow.

SOUTH AUSTRALIAN REVENUE.—From the Treasurer's financial statement it appears that although a considerable deficiency on the revenue for the year 1865 was anticipated, there was a small balance to carry to 1866. There was a net deficiency of £23,821 between the esti-

mates for 1865 and the sums actually realized. The increases were under the head of public works, fees, &c. The amount of the new duties collected, and which were now in course of repayment, was £136,328. The amount of duties collected in 1865, under the head of customs duties, was £1,175,336 as against £1,098,352 in 1864. The excise revenue showed a decrease of £5,895. The sales of land by auction had produced £271,888, as £5 against £516,490. Leases under the Amended Land Act produced £116,829. The total revenue in 1865 was £3,060,265 as compared with £2,954,538 for 1864.

Obituary.

HIPOLYTE BELLANGÉ. — France has lost an able painter by the death of Hippolyte Bellangé, at the age of sixty-six, and after eighteen months of suffering. He was a pupil of Gros and associate of Charlet, and first won reputation as a lithographer. When Béranger was setting all France singing the "Petit Chapeau" and the "Redingote Grise," Charlet and Bellangé were creating those clever exaggerated types of old soldiers, which tended to rouse the popular sentiment in favour of Imperialism, and to undermine the government of the restoration. People have almost forgotten Bellangé's lithographs; his works in that class have been absorbed, as it were, in those of Charlet, but his battle pieces have won for him a higher position in the world of art. Bellangé did not cover acres of canvas with rushing battalions, but was a philosophic and sentimental artist, a true painter of military episodes. One of the most remarkable of his works was a small picture exhibited about three years since, and merely entitled an "Episode,"—two brothers or friends lay dead, one killed apparently while tending the other; an ambulance party, engaged in removing the wounded, look down on the forms of the two young heroes, and even the roughest old soldier of the party is moved almost to tears. Many of Bellangé's works are in the galleries of Versailles, the Luxembourg, and the provinces, and amongst the best known are "The Return from Elba," "The Morning after Jemmapes," "The Battle of Fleurus," "The Passage of the Mincio," "The Battle of the Alma," several episodes of the Crimean and Italian campaigns, "The Cuirassiers at Waterloo," and "The Defile after the Victory," which attracted great attention at the salon last year. Bellangé won his first medal in 1824; he obtained one of the prizes at the Universal Exhibition in 1855, was made Chevalier of the Legion of Honour in 1834, and promoted to the rank of officer of that order in 1861. He painted as long as he could hold a palette, and has left a charming work, which will appear at the coming exhibition in Paris. His son, Eugène Bellangé, is following in his father's footsteps.

Notes.

SCHOLASTIC REGISTRATION ASSOCIATION.—This association has now been formed, and resolutions have been passed by the General Committee to the effect that the association consist of all schoolmasters and teachers who approve of and are willing to promote the movement in favour of Scholastic Registration, and that all who have signed in favour of registration be specially invited to become members, the contribution to be five shillings per annum. The association will meet at such times as may be appointed, to discuss important questions relating to scholastic registration, and especially to consider the provisions of the Bill before Parliament. It has been suggested that other educational questions of general interest might also, from time to time, be brought forward for discussion. The members of the

association residing in any town might constitute a branch association for that town and neighbourhood, and might render valuable help in various ways, *e.g.*, by soliciting the support of their representatives in Parliament, by obtaining members for the association, and by introducing the subject of registration into local papers. The details of the constitution and proposed operations of the association will be arranged at a general meeting, to be held as soon as possible. In the mean time, the names of any masters or teachers desirous of joining the association will be received, and full information given, by the hon. secretary, Mr. Barrow Rule, 42, Queen's-square, London, W.C.

GREAT PRIZE IN VOLTAIC ELECTRICITY.—The *Moniteur* has officially published the decree, founded on a vote of the French legislature, which establishes a prize of 50,000 francs (£2,000) for a new application of the voltaic pile. This prize has already been mentioned in the *Journal*, but it will be well to make known the conditions of this scientific prize, now that the announcement is official. The prize is to be awarded to the author of a method which shall render the voltaic pile economically applicable in any of the following cases:—In industry as a source of heat; for purposes of illumination; in chemistry; in mechanics; or in practical medicine. A decree will shortly announce the conditions and the regulations of the competition. The prize is to be awarded within five years; but, should no discovery deemed worthy of it be brought forward before the termination of that period, the Emperor may, if he think fit, extend the time to ten years. By a second decree, men of science of all nations are invited to compete for the prize in question. The prize will remain open for five years from the 18th of April last. The claims of the competitors will be examined by a commission to be appointed by the Minister of Public Instruction.

Correspondence.

GAS METERS.—SIR,—After Mr. Glover's interesting paper on the national standards for measuring gas, the discussion which ensued was almost entirely a consideration of the comparative merits of wet and dry gas-meters; and this point was argued upon by engineers, by meter-manufacturers, and by consumers, each looking at the matter from his own (which in some cases was not a disinterested) point of view. There is, however, another point of view from which the subject should be considered, which is in connection with the pipes that conduct the gas to the positions where burners are required. For this purpose let it be presumed that both wet and dry meter manufacturers have succeeded in producing perfect instruments, by which all the troubles of imperfect or varying measurement, imperfect registration, or necessity for frequent repairs have been removed—Can it then be said that there is any advantage gained by using one or the other kind of meter? On this point there can be no doubt that the dry meter is much the more desirable instrument, inasmuch as the wet meter forms a convenient reservoir for water ready to be absorbed by the gas in passing through, and to be deposited in the pipes; and although the means of removal of the water so deposited is usually provided in a properly-designed arrangement of pipes, the inconveniences that arise are quite sufficient to decide the argument in favour of the dry meter, in connection with which no such deposition of water can take place except from causes that are entirely independent of the meter whether wet or dry. As this point seems to have escaped the attention of those present, you may perhaps deem it worth inserting in your *Journal*.—I am, &c., JAMES MATTHEWS.
367, Strand, 8th May.

EXPLOSIONS IN COAL MINES.—SIR,—In your excellent report of the discussion upon Mr. Hogg's paper on the

perils of mining, a slight but not unimportant error has crept in. I was reported as having said (p. 417) "that such sudden accumulation of gas as would cause loss of life can hardly take place in a short time." What I did say was, "that it is rare for such a large accumulation of gas as would destroy many lives at once to gather suddenly, and that, therefore, if warning were given of all accumulations, they would often be prevented before they became dangerous at all, and generally before they became so extensive as to destroy many miners at once." I should not like to have it supposed that I think all or most mine owners so indifferent to the safety of their men that they will neglect precautions unless compelled by law to adopt them, but certainly some are. Law, therefore, is required to make those observe the proper precautions which others more humane and more intelligent observe voluntarily. It would be no argument against the necessity for precautionary legislation, that many or even most of the coal owners do adopt all the precautions that can be reasonably expected, even were that true, so long as it is also true that many precautions usefully observed by some masters are neglected by many, as is undoubtedly the case.—I am, &c., P. H. HOLLAND.

Park-cottage, Pelham-street, S.W.

MEETINGS FOR THE ENSUING WEEK.

- MON.....Geographical, 8½. 1. Capt. Montgomerie, "On Yarkund and other places in Central Asia." 2. Com. Forbes, "Western shores of Volcano Bay, Yesso."
R. United Service Inst., 8½. 1. Mr. N. I. Holmes, "On the Construction and Management of the Electric Torpedo in naval and military tactics, as applied to the destruction of ships and protection of forts."
TUES....Civil Engineers, 8. Discussion upon Mr. Burnell's paper, "On the Water Supply of Paris."
Statistical, 8. Major-General Balfour, "On French and English Budgets."
Anthropological, 8.
Royal Inst., 3. Prof. Ansted, "On the Application of Physical Geography and Geology to the Fine Arts."
WED....Pharmaceutical, 11 a.m. Annual Meeting.
R. Society of Literature, 4½.
THUR....Royal, 8½.
Antiquaries, 8½.
Zoological, 4.
Chemical, 8. 1. Prof. Crace Calvert and Mr. Johnson, "Action of Acids on Metals and Alloys." 2. Mr. E. Chapman, "Action of Acids on Naphthylamine." 3. Prof. Wanklyn, "Oxidation of Iodoform from Sodium-ethyl." 4. Prof. Wanklyn and Mr. Chapman, "Formation of Ethylamine." 5. Mr. Hadow, "On the Nitro prussides." 6. Sir R. Kane, "On some Derivatives of Acetone."
Numismatic, 7.
Royal Society Club, 6.
Royal Inst., 3. Prof. Huxley, "On Ethnology."
FRI.....Philosophical, 8. Annual Meeting.
Royal Inst., 8. Rev. C. Pritchard, "On the Telescope."
SAT.....Royal Inst., 3. Prof. Huxley, "On Ethnology."

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

- Par.
Numb.
204. Wexford Convent School—Correspondence.
215. Seamen's Savings Banks—Account.
Delivered on 1st May, 1866.
121. Bill—Veterinary Surgeons.
186. Metropolitan Local Government, &c.—First Report and Evidence.
Delivered on 2nd May, 1866.

Patents.

From Commissioners of Patents' Journal, May 4th.

GRANTS OF PROVISIONAL PROTECTION.

- Axles and axle-wheels—1094—W. Y. Edwards.
Beds—1060—H. A. Bonneville.
Billiards, &c., implements used in playing—1075—G. P. Dodge.
Card cases—1074—J. H. Johnson.
Cricket—783—W. C. Fuller and J. Margetts.
Diphenylamine, preparing—1013—C. A. Girard and G. de Laire.

- Disease in cattle, preventing and curing—976—E. Ellison.
Drainage—1037—C. D. Abel.
Dyed goods, printing patterns on—1063—R. B. Legge.
Earthenware—576—T. Spencer.
Engines, distributing valves for—1054—W. and W. M. Hawdon, and H. Heather.
Engines, slide valves and reversing gear of—1038—W. Bond.
Fibre, spinning, &c.—993—J. B. Fuller.
Fibres, washing—1032—J. J., and J. Crabtree.
Fibrous materials, washing, &c.—984—J. and W. McNaught, jun.
Fibrous substances, treating—1082—T. Gray.
Fire-arms, breech-loading—1086—J. U. Zimmermann.
Fluids, forcing—1055—J. Gresham.
Four-wheeled vehicles—1089—R. Pookering.
Hydraulic presses—624—E. Cottam.
Ice—800—O. W. Jeyes.
Lamps—1020—E. Lichtenstadt.
Lees, evaporating—1049—A. Swan.
Liquids, raising and discharging—435—J. Hargrave.
Locks—1056—T. Cooper jun.
Looms—1069—A. V. Newton.
Lucern root, treating—1009—B. F. Weatherdon.
Matters, distilling—1092—C. M. Barker.
Minerals, cutting and getting—1091—G. J. Jones.
Motive power, obtaining—1047—S. Chatwood and J. Sturgeon.
Oxydation, protecting metal work from—1078—C. E. Brooman.
Projectiles—1087—C. de Caesaris.
Railways, sleepers for—1051—V. S. Fombuena.
Sash fasteners—1065—J. Adams.
Ships' boats, disengaging—1081—E. R. May.
Ships, sheathing—1044—H. B. James.
Sizing machines—1070—S. Bennett.
Slag or cinder from furnaces, treatment of—1041—J. J. Bodmer.
Soap—1058—T. Gray.
Steam boilers—1059—J. Jordan.
Steam boilers, heating water supplied to—1090—J. Marshall.
Steam boilers, preventing incrustation in—1076—J. Harris.
Steam whistles—1077—W. Cuthbert.
Stereoscopes—1085—P. W. Gengembre.
Submarine electrical telegraphic wires, laying—1068—R. E. Kaulbach.
Substances, breaking—1064—S. P. Schoonmaker.
Substances, crushing—1079—C. E. Brooman.
Substances, drilling and ornamenting—1045—W. J. Cunningham.
Substances, moulding, &c.—1057—C. H. Murray and M. Jennings.
Substances, sifting—1073—J. H. Johnson.
Surfaces, producing—999—H. Wood.
Taps—1084—J. Dickinson, jun.
Telegraphic signalling apparatus—1050—T. Brittan.
Tubular or double fabrics—1083—T. Haines.
Unfermented beverage, a new—1080—C. J. B. King.
Vertically floated paddle wheel—1012—I. M. and S. MacGeorge.
Water tuyeres—1043—E. Devey.
Weaving, looms for—1087—C. Richardson.
Yarn, warping, &c.—1095—W. Bullough.

PATENTS SEALED.

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| 2861. R. Flude. | 2883. J. Eastwood. |
| 2870. F. Prange. | 2889. B. Pitt. |
| 2871. H. Hides. | 2893. E. Myers. |
| 2876. R. Swires. | 2897. T. Whitwell. |
| 2877. C. Mole. | 3229. C. P. Button. |
| 2879. J. A. Rainé. | 349. C. D. Abel. |

From Commissioners of Patents' Journal, May 8th.

PATENTS SEALED.

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| 2890. J. E. Avy. | 2967. L. G. Speyser. |
| 2896. W. Middleton. | 2987. W. Clark. |
| 2900. J. Norris. | 3010. N. Greenhalgh & J. Mallison. |
| 2901. D. Slater. | 3095. E. B. Wilson. |
| 2906. J. Millar. | 3098. G. Ash. |
| 2907. S. Hand and J. Slater. | 3171. S. Clark. |
| 2913. G. H. Goodman and E. Bow. | 3365. J. J. and E. Harrison. |
| 2915. E. Guthrie. | 32. W. E. Newton. |
| 2918. J. Stephens. | 45. A. V. Newton. |
| 2923. J. J. Long. | 488. C. Mather. |
| 2931. T. A. Weston, J. Tangye, and R. Chapman. | 556. W. Nunn and C. W. Brown. |
| 2934. J. T. A. Mallet. | 578. W. E. Newton. |
| 2959. T. J. Perry. | 640. A. V. Newton. |
| 2961. R. A. Brooman. | 684. A. V. Newton. |
| | 748. J. Macintosh. |

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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| 1005. J. McF. Gray. | 1135. A. Sturrock. |
| 1132. I. M. Singer. | 1138. J. Park. |
| 1124. W. Glover. | 1146. C. A. Day, A. Lamb, and T. Summers. |
| 1137. A. V. Newton. | 1167. W. Boaler. |
| 1288. W. E. Newton. | 1267. J. T. Markall. |
| 1111. J. M., E., and C. Johnson, and L. Bertling. | 1126. S. B. Cochran. |
| 1127. T. Sugar and J. Wilkinson. | 1293. E. Barlow, J. Ashworth, jun., J. Newhouse, F. Hamilton, and W. Hope. |
| 1133. G. Davies. | |
| 1157. E. C. Boet. | |
| 1218. G. T. Bousfield. | |

PATENT ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

1120. J. G. Willans.